Automotive Grade Linux Developer BoF Session

Embedded Linux Conference Europe
October 28, 2019

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What is AGL?

Collaborating to build the car of the future through <u>rapid innovation</u>

- Open source Linux-based collaborative project
- Hosted at Linux Foundation
- Focused on rapid innovation of vehicle software using the AGL Unified Code Base

Total of 11 OEMs supporting AGL!

Accounts for approximately 60% of worldwide annual vehicle shipments

Sources:

https://en.wikipedia.org/wiki/List_of_manufacturers_by_motor_vehicle_production

https://www.statista.com/statistics/275520/ranking-of-car-manufacturers-based-on-global-sales/

AGL Members - Total of 155 companies!

Platinum

DENSO · MAZDA · Panasonic
RENESAS · SUZUKI · TOYOTA

Gold

HONDA — The Power of Dreams

Silver

AISIN AW CO.,LTD. · amazon · Mercedes-Benz
DENSO TEN · DRIMAES · Ford
NTT DATA MSE Corporation · QUALCOMM · SAIC MOTOR 上汽集团
VOLKSWAGEN AKTIENGESELLSCHAFT · WIND RIVER · 蓝星科技
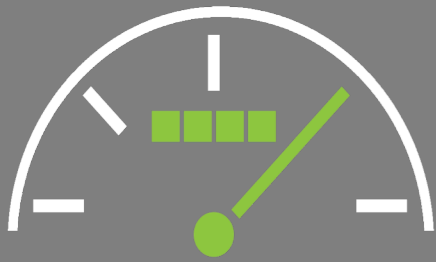
Bronze

Abalta · ACTIA · Adobe · ADIT · Airbiquity · ALPSALPINE · ARC CORE · ARKAMYS
arm · audiokinetic · Baylibre · BearingPoint. · BedRock Systems Inc. · BIG LAKE SOFTWARE · BlackRidge TECHNOLOGY · BOSCH
BOSE · bright box · Brison · CGISTUDIO · Capgemini · 中国移动 China Mobile · cinemo · cloudbees
Codethink · cognomotiv. · COLLABORA · Continental · CRAVE.io · cybertrust · dellfer · DESAY SV automotive
Elektrobit · ENEA · epam · ETRI · Eureka, Inc. · FIBERDYNE · FORGEROCK · FPT Software
FUJITSU · German Autolabs · GitHub · GlobalLogic · Green Hills Software · HARMAN · here · HI CORP.
HITACHI Inspire the Next · HYUNDAI · HYUNDAI MOBIS · ICS · itow Technologies LLC · igalia · insignary · intel
IOT.BZH · irdeto · IVIS · JVC KENWOOD · Karamba Security · KERNKONZEPT · Kinetica · Konsulko Group
KPIT · LEAR corporation · LG · Linaro · LUXOFT · mcloudware · MEDIATEK · Mentor
Microchip · micware · MITSUBISHI MOTORS · Mitsubishi Electric Changes for the Better · KOMPAS · MontaVista · MOVIMENTO · NEC
Neusoft · NEXIUS · NEXTY Electronics · NIPPON SEIKI · NUANCE · NVIDIA · NXM · NXP
NYU Tandon School of Engineering · O3IGO · OPENSYNERGY · ORACLE · OTAinfo · OUTCERT · OVO AUTOMOTIVE · PARAGON SOFTWARE
Pioneer · Pocket Soft · RADIO & SOUND · Hochschule Reutlingen Reutlingen University · SAFERIDE · SAMSUNG · cloud · SASKEN
SiFive · SiriusXM · SITECH DEV · SONY · Spireon · STAR LAB · SUBARU · Suntec
SYMBIO · SYNOPSYS · SYSGO EMBEDDING INNOVATIONS · T-Systems · TELENAV · Texas Instruments · Qt The Qt Company · ThunderSoft
TOSHIBA · Total · TREND MICRO · Trillium · TUXERA · Ubiquitous AI Corporation · VENIAM · VeriSilicon
Virtual Open Systems · vnc AUTOMOTIVE · voicebox · wipro · Witekio EMBEDDING SUCCESS · WITZ · Xevo

AUTOMOTIVE GRADE LINUX

the only organization addressing **all software in the car**

Infotainment

Instrument Cluster

Heads-up Display (HUD)

Telematics/ Connectivity

**Functional Safety**

Advanced Driver Assistance Systems (ADAS)
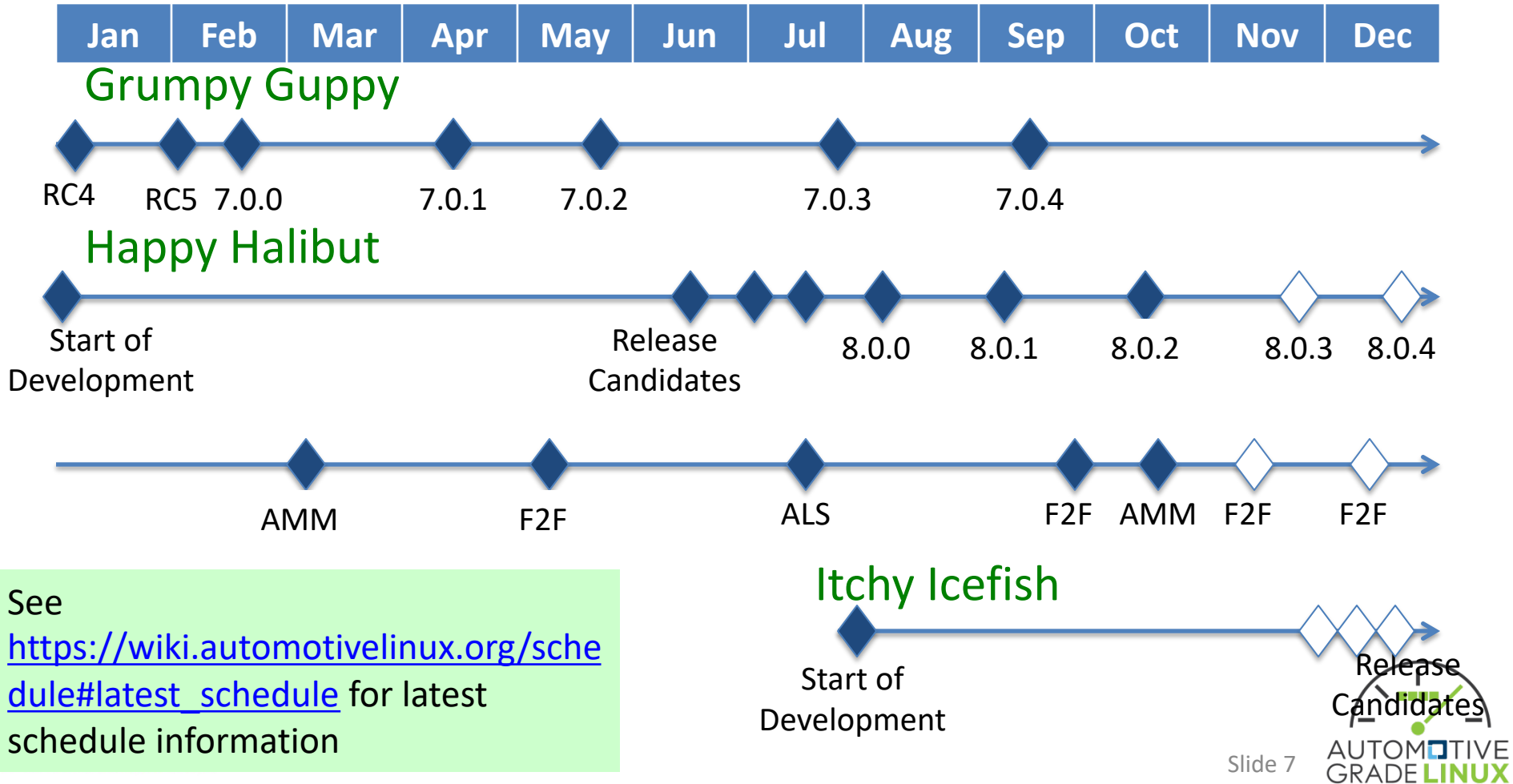
Autonomous Driving

AGL Unified Code Base

- Develop a single open source software platform for the entire industry, reducing fragmentation

- Provide at least 70% of the base platform for production projects

- Cultivate an ecosystem of developers, suppliers, and automotive expertise all using a single platform

- Reference hardware and applications available for adaptation

2019 AGL Schedule (Current)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Grumpy Guppy

RC4   RC5   7.0.0   7.0.1   7.0.2   7.0.3   7.0.4

Happy Halibut

Start of
Development

Release
Candidates   8.0.0   8.0.1   8.0.2   8.0.3   8.0.4

AMM   F2F   ALS   F2F   AMM   F2F   F2F

Itchy Icefish

Start of
Development

Release
Candidates

See
https://wiki.automotivelinux.org/sche
dule#latest_schedule for latest
schedule information

Slide 7

AUTOMOTIVE
GRADE LINUX

AGL Architecture

Platform
- Base BSP
- Security
- AGL transport

- **Micro Services based**
- Middleware and App Binding / Binder Model
- Downloaded on platform
- Multi-ECU
- Car to Cloud
- Car to Car
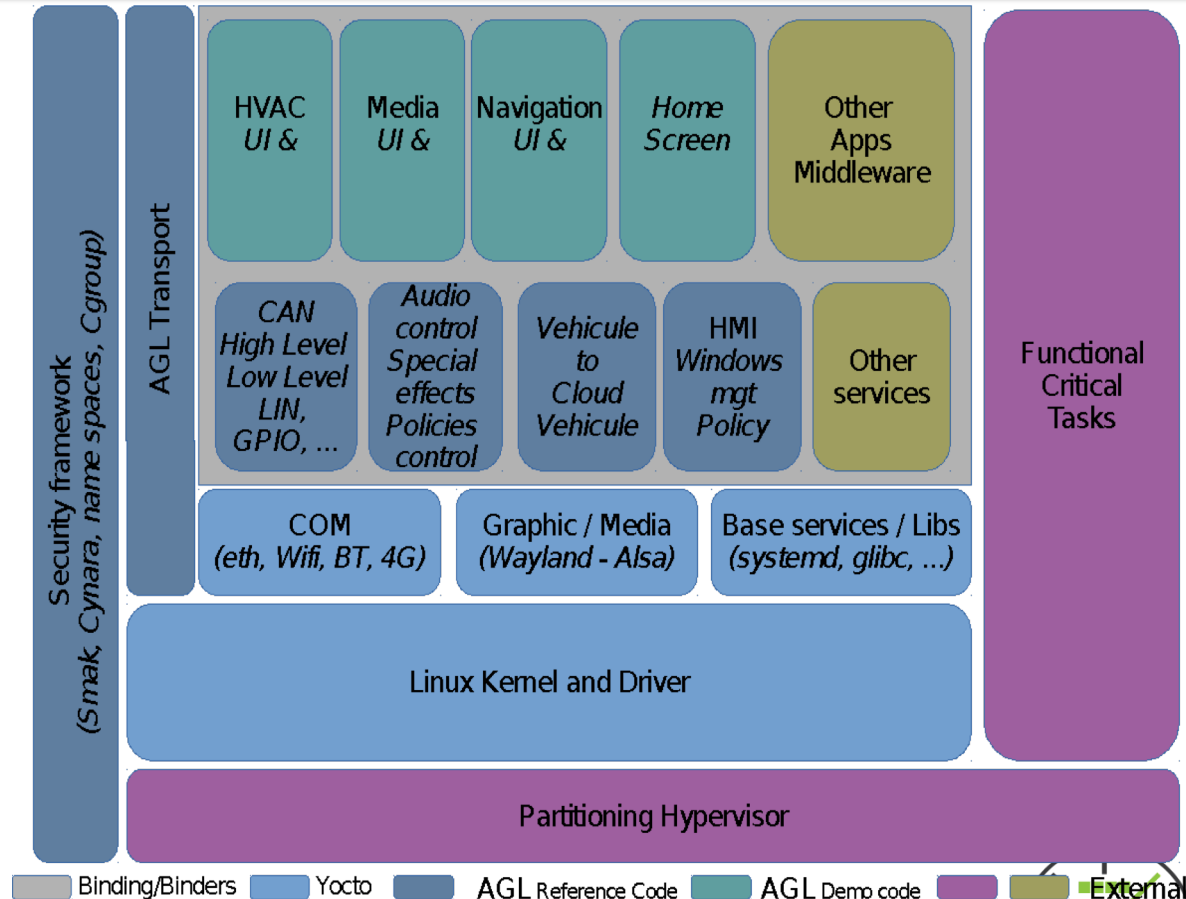
AGL Binder/Binding
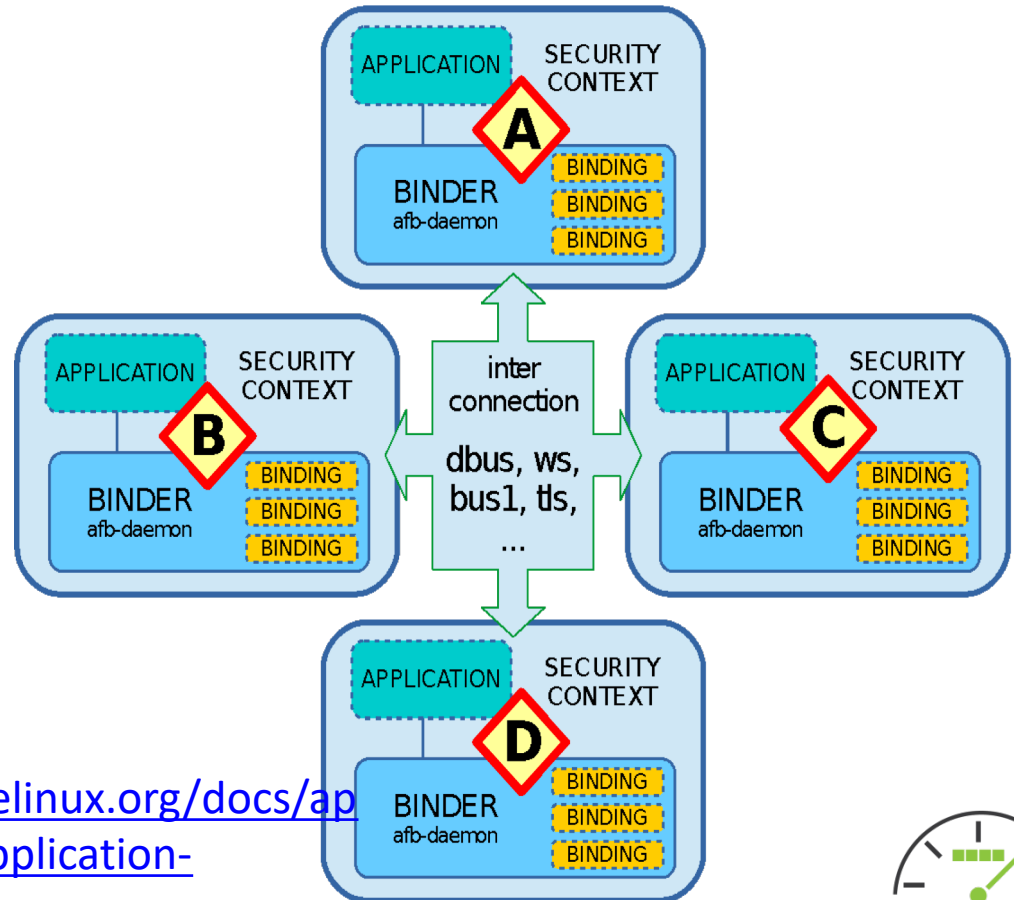
Security Context
- SMACK based

Binder
- Secure environment for an App
- Container process
- Transport
- Security
- Standardized Async API structure

Binding
- Adds one API to the Binder
- Implements feature
- Multi thread support
- Standardized integration

http://docs.automotivelinux.org/docs/apis_services/en/dev/#application-framework-binder

AGL Binder/Binding

- Available binders include
  - Home Screen
  - Window Manager
  - Audio
  - Connectivity (Networking, Wifi, Bluetooth, Vehicle Signaling, Telephone, Phone Book, NFC)
  - Location (GPS, Geofence)
  - Media Player, Media Scanner, AM/FM Tuner
  - Signal Composer, HVAC

SDK for App Developers

- XDS Based SDK
- Docker image to eliminate host dependency issues
- Available for reference boards with published images that include graphics drivers
- Enables rapid AGL application development Support for Qt (HTML5 planned!)
- No Yocto knowledge is needed or assumed for SDK users

http://docs.automotivelinux.org/docs/devguides/en/dev/#development-kit-build-agl-application

DEVELOPER RESOURCES

AGL Documentation

- Getting Started
  https://wiki.automotivelinux.org/start/getting-started
- AGL documentation site
  http://docs.automotivelinux.org/
- AGL Wiki
  https://wiki.automotivelinux.org/
- AGL Jira
  https://jira.automotivelinux.org/

Get The Code

- Pre-built binaries and source tar balls available
  - https://www.automotivelinux.org/software/download
- Latest Source Code and Build Instructions
  - https://wiki.automotivelinux.org/agl-distro/source-code
- Release Notes

https://wiki.automotivelinux.org/agl-distro/release-notes

AGL Code

- AGL gerrit

    http://gerrit.automotivelinux.org/

- AGL git

    https://git.automotivelinux.org/

Ask Questions

- Weekly Developer Call on Tuesdays

  https://wiki.automotivelinux.org/dev-call-info

- IRC channel #automotive on freenode.net

  Discussion about open source software for vehicles. No help for mechanical issues should be accepted from anyone on this channel.

- Weekly Newsletter

  https://wiki.automotivelinux.org/newsletter

- Dev Community Mail List

  https://lists.automotivelinux.org/g/agl-dev-community

2019 F2F Workshop Update

- Mar 5-7 – Tokyo AGL AMM
- May 7-9 – A Coruña, Spain (Igalia)
- July 16 – Tokyo - Day before Automotive Linux Summit
- Sep 24-26 – Berlin (VW/ Carmeq)
- October 21 - 24 – Monte Carlo – AGL Fall AMM
- Nov 11 – 13 – Karlsruhe and Yokohama – CES Integration Session #1
- Dec 10 – 12 – San Francisco – CES Integration Session #2
- Jan 7-10 : CES 2020

Q & A

Q & A

- This is the segment where
  - You ask intelligent, well thought out questions
  - I ramble pointlessly and unintelligently
- And/Or
  - You ask "dumb" questions
  - I respond with concise, insightful, and well-reasoned answers

THANK YOU